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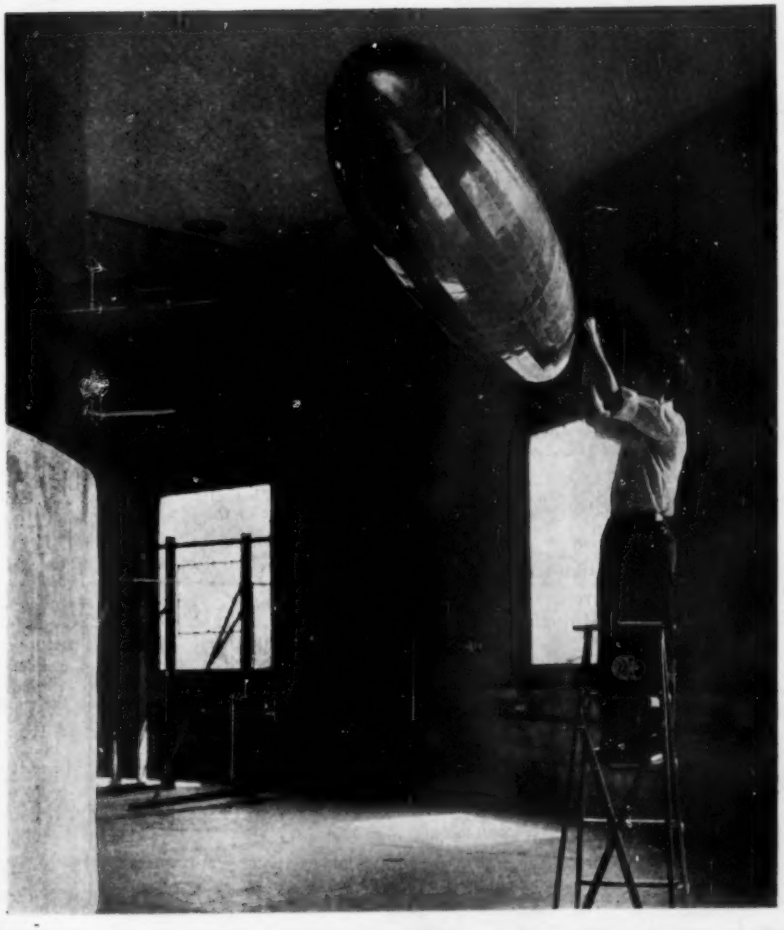
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



AUGUST 3, 1935

Putting the Model To Test

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXVIII No. 747

The Weekly Summary of Current Science

Published Every Saturday by

SCIENCE SERVICE

THE INSTITUTION FOR THE POPULARIZATION OF SCIENCE organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Edited by WATSON DAVIS

Subscription rates—$5.00 a year postpaid; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian subscribers please add 50 cents a year, foreign subscribers 75 cents a year to regular subscription rate to cover postage.

Members of the American Association for the Advancement of Science have the privilege of subscribing to the SCIENCE NEWS LETTER at the reduced price of $3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A.A.A.S., Smithsonian Institution Building, Washington, D. C.

In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 2101 Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

Publication Office, 1930 Clifton Ave., Baltimore, Md., Editorial and Executive Office, 2101 Constitution Ave., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Advertising rates furnished on application.

Member Audit Bureau of Circulations.

DO YOU KNOW?

Garden lovers are reviving interest in "old" roses that were grown in gardens before the modern hybrids were developed.

To replace imported cork, German scientists have developed as a new heat insulating medium a chemically-hardened foamy substance, a so-called cellular glue.

To speed root formation in tree and shrub cuttings, University of California scientists make slit cuts in the base of the cutting and cover the wounds with a light clay paste.

The Smithsonian Institution at Washington has three terra cotta cones which a king of Ur of the Chaldees had inscribed and buried in a temple wall at Ur 4,000 years ago.

The Missouri Experiment Station says that it is a mistaken idea that weeds turned under in plowing for wheat will add fertility to the soil; for weeds contain too little nitrogen and too much woody matter.

One under-sea valley off the Maryland coast drops 9,000 feet below sea level.

A British physician once said: "The infant mortality rate is the most sensitive index we possess of social welfare."

Five of New Mexico's Spanish missions and Indian pueblos have been made state monuments, thus preserving them against vandalism.

Ancient Mexico knew the idea of "cutting speech," for old Indian picture writings show men in an argument pictured with knives coming out of their mouths.

A giant stone hand-axe, over 15 inches long and weighing over 14 pounds, has been unearthed in England, and its use to Stone Age man is a puzzle.

If vineyards become infested with leafhoppers—whitish insects with red and yellow markings—a season of good weather, good soil, and good cultivation can be spoiled for the grape grower.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

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PSYCHOLOGY

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PUBLIC HEALTH

Where has the condition of mottled teeth been increasing? p. 72.

PHYSICS

Device for Rapid Sectioning Will Aid in Detecting Crime

Three-Inch Tool Makes it Possible to Cross Section Hair or Fibers Without Crushing in But Ten Minutes

A DEVICE having almost unlimited possibilities in many fields, including crime detection, the fur industry, textile manufacture, and agriculture, has been invented by Dr. J. I. Hardy, fiber technologist of the U. S. Department of Agriculture. The invention makes possible the rapid cross-sectioning, microscopic study, and photographing of the delicate inner structure of hair, wool, fur, silk, cotton, and other fibers without injury. Very thin cross-sections can now be made in ten minutes. Formerly it took several hours to obtain less satisfactory results.

Realizing its application to the Department of Justice's attack on the racketeer and gangster, J. Edgar Hoover, director of the Federal Bureau of Investigation, has caused a careful study of its uses to be made.

"Our technical experts are studying this device to determine whether it can be utilized as a new means of examining fibers and hairs. The simple and rapid method is the sort of technique well adapted to the needs of investigators seeking to solve crime where time, detail, and accuracy are of the utmost importance," he said.

Besides its use to cross-section quickly any hair or tuft of clothing a criminal might leave behind him, the invention promises to be of value in detecting misrepresentation of quality of clothing or furs, a common practice of the fur-racketeer. It should also have its use in legitimate comparison of quality, as well as aiding stockmen and cotton growers to know what types of plants or animals produce the fibers most demanded by industry for high-quality products.

Three metal parts make up the device, which is three inches long altogether. By means of a screw-controlled plunger, fibers are moved in a tiny slot 0.0085 of an inch wide and made to project slightly while held tightly together in proper alignment. A drop of quickly-drying celluloid on the projecting fibers "fixes" them so that they can be sliced off crosswise in any thickness desired down to one ten-thousandth of an inch. Even such hairs as those of the deer, hollow inside, are not crushed or injured, due to the celluloid.

Photographed after being magnified 500 times, cross-sections show almost as many different designs as snowflakes. Rayon fibers in cross-section look like animal crackers. A hair of the vicuna, a llama-like South American animal inhabiting the Andes of Ecuador and Bolivia, frequently resembles a four-leaf clover.

Study of hair brings out interesting contrasts. Curly human hair is usually oval in cross-section, while straight hair is more circular. Hair of the land otter is of exceeding fineness, and the hair from an elephant's tail resembles a tooth-pick more closely than anything else.

Science News Letter, August 3, 1935

MEDICINE

Danger of Snakebite Is Greater Than Supposed

THE chances of being bitten by a poisonous snake are considerably higher in the United States than most people have comfortably supposed.

The pleasant tradition that about 24 species of poisonous snakes roamed their peaceful way in the United States, only seldom crossing the path of a startled human and striking him, is based on nothing more substantial than a lack of information, is shown by Dr. Thomas S. Githens of the Mulford Biological Laboratories of Sharp and Dohme Co., Glenolden, Pa.

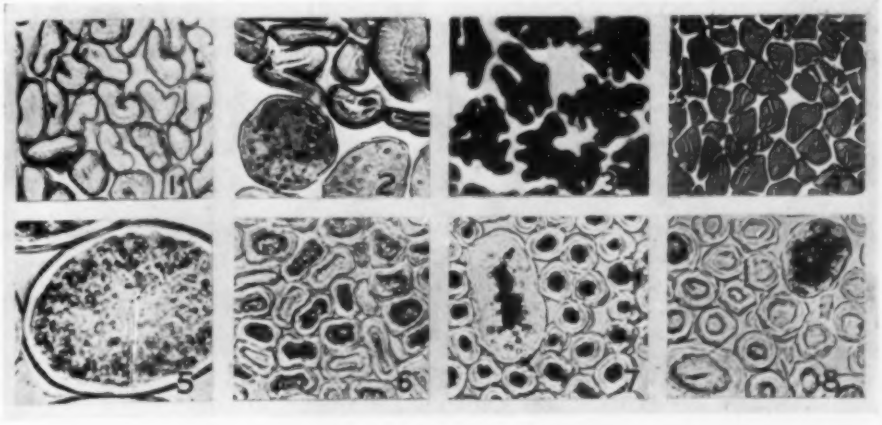
Dr. Githens reports to the *Scientific Monthly* that he has recorded 2,376 cases of snake bite in this country in the past eight years. And this is obviously a far from complete accounting. Only such cases as physicians reported to the laboratory, by filling in a report form accompanying each package of antivenum, and such cases as could be found in newspaper items were available for the survey.

Expressing surprise at the "unexpectedly large number" of cases thus revealed, Dr. Githens believes there may be 1,500 to 2,000 cases of snake bite each year in the United States.

Heretofore the most complete investigation of the subject was made in 1908, when reports of snake bites for almost a century back were counted and only 740 found. The investigator thereupon announced the annual number of poisonous snake bites "excessively small" and growing less as the vipers were being "slowly but surely exterminated." Wrong on both counts, Dr. Githens finds.

Rats and mice increase rapidly when wilderness country is converted into farm land, the biologist points out. And all snakes, including the poisonous ones, become more abundant through this turn of affairs, only thinning out when a community grows into a thickly settled city.

(*Turn to Page* 68)



SLICES OF FIBERS

A new device makes it possible to cut hairs quickly into thin cross sections like these for microscopic examination. Cotton is shown in the first view; number 2 shows a comparison of cotton, above, with wool; 3 is rayon; 4, silk; 5, human hair; 6, rabbit fur; 7, muskrat fur; and 8, fox fur.

Of the 24 kinds of North American pit vipers, 10 kinds caused all of the bite cases, aside from persons bitten by captive snakes.

The largest and most dangerous serpent in the United States is the Florida diamondback rattlesnake. The pigmy rattler rates as the smallest and least dangerous of the poison group. Aside from widespread copperheads and timber rattlers, most of the species are largely limited to some particular zone.

A surprising feature of the inquiry is finding the large number of persons bitten by snakes while intentionally handling them. One bite in 15 is received in this way, says Dr. Githens. Of 163 such cases, 47 were ignorant persons, often children, who unwittingly picked up a dangerous snake. Professional snake catchers had 48 of the bites recorded, showmen in fairs or carnivals had 31, and scientists studying snakes or extracting venom had 23.

And supposedly dead snakes inflicted 14 bites.

Science News Letter, August 3, 1935

PSYCHOBIOLOGY

First Birthday Reported For Only Known Chimpanzee Twins

THE TWINS Tom and Helene are to the chimpanzee world what quintuplets are to the human family. They are the only pair of undoubtedly genuine chimpanzee twins known to science. Their first birthday has just been reported to the scientific world.

The story of their development, the cutting of their baby teeth, their learning to crawl and walk and climb, and their mental growth has now been told by their scientific guardians, Dr. Robert M. Yerkes, director of Yale University's Laboratories of Comparative Psychobiology, and Michael I. Tomilin, who had so much to do with their upbringing that, as he puts it, he was accepted as a member of the family. (*Journal of Genetic Psychology*, June.)

Mona, the mother, has been called "an experienced mother." She had already had three babies before the twins arrived. Recently a grandchild of hers, the first "civilized" chimpanzee grandchild born of a captive-born mother, arrived and was announced to the scientific world.

Twins provided no thrill to Mona. Rather she seemed bored with this doubling up of her maternal duties. Nevertheless, she gave them good care and was particularly gentle with tiny Helene, who was the weakling. This tenderness toward the frailer infant was of great interest to those watching her, because, so far as is known, none of the lower mammals ever discriminate in favor of a weakling or runt.

"Such discriminate attention as was manifest in this case of chimpanzee mother and twins may chance to be peculiar to the primates or to the anthropoid apes and man," the scientists report.

The twins were perfect little creatures when born but extremely tiny—only about two or three pounds in weight and very weak. Helene was especially weak and inactive. It was not until the fourth day after her birth that she was able to nurse. But due to her mother's good care, she picked up weight and was even larger than her twin brother for the first six months. After that Tom took to his supplementary feeding better than Helene and soon outstripped her in growth.

The first teeth came in the same order that the human baby cuts them, but because of the more rapid development of the apes they appeared much earlier.

Personality differences were as obvious in these chimpanzee babies as they would be in any pair of human infants. Tom was always the adventurer, aggressive, eager and playful. Helene, the mother's favored one, was relatively timid, shy and backward. It was she who hesitated to make friends with Mr. Tomilin. She would cling shyly to her mother, and as she grew older would run to her brother for protection. It was six months before the twins recognized each other as playmates, and then it was Tom who would take the initiative in their monkey-shines.

Mona was a modern sort of mother and believed in training her twins to be self-reliant and independent of her. Whether with the deliberate intention of instructing them, or merely to rid herself of her peculiar double maternal burden, she continually trained the children to shift for themselves. She encouraged them in grasping, crawling, standing, climbing and walking. When, for example, a twin, holding to his mother, happened in passing to grasp the cage netting, Mona would seize the opportunity for a lesson. She might push the infant against the netting and move away. Or again she might place an infant on the netting and leave it hanging there to climb, play or scream.

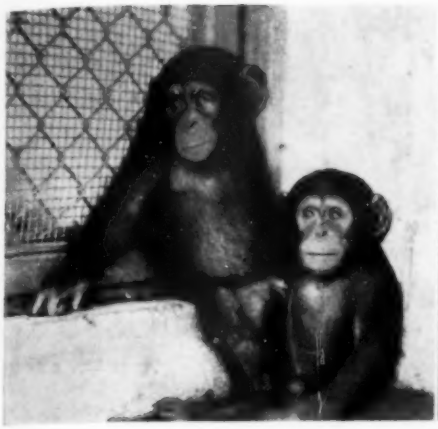
CHIMPANZEE TWINS

Moments in the life of chimpanzee twins, showing characteristic poses and modes of travel.

Hitch-Hiking

Hey—Wait for Me!

All Aboard



The Twins: Tom and Helene

Chow

Forty Winks

When Mona was tired of the clinging babies, or wished them to fend for themselves, she would sometimes resort to discipline. She might brush one aside, shake it, strike it or bite its hands—always gently.

"Sometimes as the mother thus roughly treated her young she would scream as if in impatience or anger," the scientists said. "To us the behavior suggested impotent rage, for the infants usually complained so bitterly that they compelled their mother to relent."

Like a human bad child, when the chimpanzee infants failed to get what they wanted, they would throw themselves on the floor and scream.

"Mona seldom could long resist this infantile appeal. Manifestly struggling against conflict, she would go to the infant, take it up and for a time indulge it. Then self-interest having gained dominance, she would once more antagonize the twin and the scene would be repeated.

"Usually the infant won eventually and peace was restored."

Even modern-minded Mona would rock her babies to quiet them, however. When the little one was restless or complaining, the mother would hold her hand or arm under the baby and then move her arm rhythmically back and forth until the child was soothed to rest. The mother was so large and the babies so tiny that both twins could thus rest on one arm of the mother.

Science News Letter, August 3, 1935

Eastern brook trout cannot withstand competition with other species of fish, but they thrive if protected in high mountain lakes, in pools and quiet streams.

Milk that is over 50 hours old cannot be sold in the city of Chicago, according to a new ruling.

PHYSICS

Prof. Bohr Opposes Einstein In Quantum Theory Controversy

Leading Exponent of Theory Points to "Ambiguity" In Einstein's Test As Applied to Quantum Mechanics

CONTROVERSY reigns in the world of mathematical physics.

Following Prof. Albert Einstein's attack on quantum theory (*See SNL*, May 11, 1935) on the grounds that it does not give a complete description of physical reality, the battle is now joined by Prof. N. Bohr, the famous scientist of the Institute of Theoretical Physics at Copenhagen.

Prof. Bohr is one of the leading exponents of quantum theory, for certain developments of which he was largely responsible. The theory was initiated by Prof. Max Planck, and other names associated with it are those of de Broglie, Dirac, Eddington, Heisenberg, Jeans and Schroedinger.

Prof. Bohr's initial rejoinder is in the form of a letter to the editor of *Nature* (July 13). He is shortly to publish a longer communication in the *Physical Review*, where the paper by Prof. Einstein, Dr. Boris Podolsky and Dr. N. Rosen was also published.

Prof. Bohr's criticism of the deductions of Einstein and his co-authors is based on disagreement with their criterion, or standard of test, of physical reality. He does not think that their definition of this reality can be appropriately applied to problems of quantum mechanics.

Said Prof. Bohr:

"Since, as the authors show, it is always possible in quantum theory, just as in classical theory, to predict the value of any variable involved in the description of a mechanical system from measurements performed on other systems, which have only temporarily been in interaction with the system under investigation; and since in contrast to classical mechanics it is never possible in quantum mechanics to assign definite values to both of two conjugate variables, the authors conclude from their criterion that quantum mechanical description of physical reality is incomplete.

"I should like to point out, however, that the named criterion contains an essential ambiguity when it is applied to problems of quantum mechanics." *Science News Letter, August 3, 1935*

CHEMISTRY-ANIMAL HUSBANDRY

Spectroscope Detects Traces Of Selenium in Soil

WHAT may be a new aid in combating cattle poisoning caused by the animals eating plants grown in selenium-poisoned soil was reported to the Third International Conference on Spectroscopy, meeting at Massachusetts Institute of Technology.

Dr. George R. Harrison, professor at M. I. T., has been able to detect spectroscopically traces of selenium as low as one part in a million.

Science News Letter, August 3, 1935

MEDICINE

A Skyrocket Scourge

Infantile Paralysis Epidemic In South Found To Shoot Across an Area to a Focal Point and Then Burst

By ROBERT D. POTTER

IN THE blistering heat of a mid-July day the two men looked at the wall map with its multi-colored pins.

"That makes 338," said one as he pushed another black-headed pin into place.

The map was the outline of North Carolina. The men were Dr. Carl V. Reynolds, State Health Officer, and Dr. J. C. Knox, State Epidemiologist. Each pin represented tragedy in some North Carolina home: a disease-wracked little body tossing in a bed; a case of infantile paralysis.

In the offices of North Carolina's health department at Raleigh the epidemic of poliomyelitis — more often known as infantile paralysis—seemed far away. There was no rushing of nurses to aid stricken victims; only the high ceiling, dim room, the wall map with its ever-spreading pins and the ringing telephones.

"Dr. Knox, this man wants to know if it's all right to take his three children on a trip to his shore cottage," said the secretary at the phone.

"Here's some more telegrams, Dr. Reynolds. A woman from Detroit wants to know if she dare takes her children to camp in the mountains," said another.

"Dr. Jackson reports a case in Dare County over near Cape Hatteras."

And another black pin, used to designate cases in July, was stuck in the wall map.

"Staff headquarters" in the current fight of medicine against disease was in action.

Pins Tells the Story

"Look at the pins," agreed Drs. Reynolds and Knox—the men on the spot —when asked how the epidemic came about and where it was going.

The pins tell the story.

"See that orange pin," said Dr. Knox. "Here it is way over in Jackson County near the western boundary of the state. That's a case last February.

"Then look at the dark and light blue pins. They are cases in March and April. See how they come eastward across the state. Those green pins for May take an alternative route and scatter a bit more, but they also come east.

"And now look at the red pins."

One can't very well miss them. They from a red blot all over Wake County, where Raleigh is situated.

"Here's where it burst," said Dr. Knox.

"What burst?"

"The skyrocket," he replied. "Maybe I'm wrong but the spread of this epidemic across North Carolina resembles, for me, nothing so much as a menacing skyrocket. It came across the state from west to east. Then it hit Wake County and burst around and in Raleigh. See how it spread to the surrounding territory from the focal point in the city."

What carried the disease across the state? Why did it pick on Raleigh as a "bursting point?"

How Does It Spread?

Medicine would give a lot to know the answers to those questions.

It is known, however, that direct contact with stricken victims of the disease is not necessary for its transmission. Rarely, for example, are there two cases in the same family.

Like typhoid fever and diphtheria, infantile paralysis can be and usually is spread by "carriers"; people who have the disease in so mild a form that they are not classed as sick, and yet provide a menace for others.

Fortunately, it seems, the greatest number of people with whom the carriers come in contact have sufficient natural immunity to prevent the incidence of the poliomyelitis. Persons without the natural immunity are the ones who contract the affliction. Wandering about, a single carrier can thus give rise to several cases. When the disease is brought into fertile territory where non-immune persons are numerous, an epidemic may result.

Apparently Raleigh and Wake County were virgin "soil" for the polio virus. From the way the epidemic waged there for a few weeks and then spread north, it seems as if the disease — like some plant pest—finally ate itself out of food and then moved on.

For frightened parents to the northward in the path of the approaching scourge, there is only one sure and almost impossible method of prevention with which to protect their children. That is to keep them, as much as possible, away from playmates and all types of gatherings. Complete isolation is the only sure preventive.

What do the pins in the wall map tell of the future?

Their numbers tell that for North Carolina, at least, the worst of the epidemic is apparently over. The peak seems to have been passed.

Epidemic Heads North

But North Carolina's problem has turned out to be Virginia's.

Put a map of Virginia above one of North Carolina and you have the picture. Where North Carolina's cases are dwindling, those of Virginia are on the increase. And the biggest increase is coming in those counties right on the North Carolina border. Roughly, the case pins in the Virginia map spread out in a broad band following the great north-south highways through the state.

How far will the epidemic progress northward? Health officers in the cities of Richmond, Washington and Baltimore would like very much to know. Richmond already seems to have been reached by the scourge.

Past experience with polio epidemics points to a decline in the number of cases after the middle of August. The coming of cooler weather usually brings the end. How far the epidemic will spread north, therefore, is in many ways a race with the seasonal weather.

Federal H Men

The epidemic of infantile paralysis now working its way northward into Virginia has brought into public notice the Federal "H Men." You've never heard of the "H Men"? Few people have.

H Men are the medical scientists of the Public Health Service in Washington. There are few better ways of describing these physicians who work from the "top" in the nation's capital and trail epidemics of all kinds from Maine to California.

Like the G Men of the Department of Justice, the H Men can not be touch-

ed by local communities, and for the great experiment of modern medicine now going on in North Carolina this freedom from restraint is the saving factor.

Poliomyelitis — polio for short — is their current Public Enemy No. 1. See how the H Men are working the matter out in North Carolina.

At present there is no certain way of immunizing children from polio. If you have natural immunity, you probably won't get the disease. If you haven't natural immunity, you have to stay clear of all gatherings and other crowded contacts until the danger during epidemics is past.

Two Weapons Needed

Medicine needs two things to fight the disease successfully. It would like some simple quick test to tell who is immune and who is not, like the Schick test for diphtheria. There is no such test now available.

Second, medicine would like some serum or vaccine which would provide artificial immunity in those unfortunate enough to lack the natural kind. Medicine may have such vaccines right now.

The vaccine applicants for the honor are two. One is the discovery of Dr. Maurice Brodie of the New York City Health Department, the head of which is the world-famous bacteriologist Dr. William H. Park. This is the so-called Park-Brodie vaccine about which one reads so much.

The second vaccine is the development of Dr. John A. Kolmer of Temple University Medical School in Philadelphia. It differs from the Park-Brodie type somewhat in its preparation but appears to obtain the desired results in patients into which it is injected.

Both vaccines—and their discoverers will frankly admit it—are still in the experimental stage. They have been tried on hundreds of cases, to be sure, but medicine, from long experience, demands further proof of their value in treating poliomyelitis.

Medical Proving Ground

The current North Carolina-Virginia epidemic is providing the "field" laboratory and medical proving ground to test the vaccines' worth. The Federal H Men have been assigned to the job of making the test.

The eyes of the medical world are on the North Carolina test for two reasons: it is the first epidemic which has occurred since the vaccines were developed and tested in a small way on human beings; and strange as it sounds—the test is really a "test."

Dr. James P. Leake, senior Public Health surgeon in charge of serums and vaccines, directs the crucial vaccine test. In his opinion it will be the most impartial and hence the most valuable experiment of its kind ever undertaken.

Under him, working at Greensboro, N. C., is Dr. A. G. Gilliam, who selects the children who are to serve as the controls in the experiments and those who are to receive the Park-Brodie vaccine.

And there is Dr. W. P. Dearing, who hopes to set up a similar control experiment on the vaccine's value in another part of the state.

These are the three H Men now fighting poliomyelitis.

Giving the vaccine to one child, withholding it from the next, and so on, seems like a simple matter, but for Dr. Gilliam particularly the pressure is on.

Consider the experiment from the parents' point of view, and you can see why. Here is a vaccine which offers the hope, at least, of protecting their own children from polio. It may not help but at least it does no harm. To a parent the situation is one where there is everything to gain and nothing to lose. Each parent feels that his child has to have the vaccine. But Dr. Gilliam knows that for a successful test the vaccine just can't be passed out to those who want it, and the children of "don't care" parents used as controls.

That's been the trouble with past tests of a similar nature.

Disease Hereditary?

There is a strong suspicion now that heredity plays a part in the incidence of polio. Dr. W. Lloyd Aycock, of Harvard's Infantile Paralysis Commission, can tell you many reasons why this seems to be so.

Dr. Aycock is working in North Carolina, incidentally, with the Federal H Men on other investigations to test further his belief that the family history tells who may contract the disease. But more of that later.

Suppose Dr. Gilliam gave the vaccine to the careful parents who are eager for their children to receive the possible protection and that he used the less intelligent part of the population who by ignorance or prejudice don't want it as controls for the test.

He would arrive at results, to be sure, but what kind would they be? Dr. Gilliam, if he worked in this fashion, would be balancing one type of society against another. The same criticism applies if he used children in institutions for both controls and for vaccination, as has been done before.

What is wanted, and what brings pressure on the problem from every angle, is a complete, impartial and rigid sampling of North Carolina's population from all grades of the social scales, Negro and white alike. The selection of children to be vaccinated needs to be done with all the randomness of a "straight" lottery.

The situation is hard on individual parents, but medicine will find out something of immeasurable value if the crucial test is so carried out. It's the job of the H Men to see that it is.

Selection of Children

Dr. A. G. Gilliam's Greensboro experiment is the key test in the whole experimental program now under way.

Alternate children rigidly selected by lot receive the Park-Brodie vaccine and the others serve as controls. The choice of who gets the vaccine and who doesn't means much to individual cases. So much pressure has been brought to bear on Dr. Gilliam that the state health officers are only too glad to have an outsider—a Federal H Man—come in and accept responsibility for administering the test.

A prominent doctor in the North Carolina Medical Society, for example, pulled every string he knew to have his children chosen to receive the vaccine. He failed and this illustrates how sentiment can not be allowed to interfere with a true scientific test.

How Dr. Gilliam circumvents outside pressure is shown by the Greensboro set-up.

All parents in the community who wish to have their children considered as applicants for vaccination notify their family physician. The physician submits the names to the office of Dr. Gilliam.

Half the names are chosen to receive the treatment and the other half serve as controls. Then the parents of those children chosen for vaccination are notified to report back to their family doctor to receive the injections and at the same time the doctor is supplied with the vaccine.

Both Groups Important

No one knows, unless they talk too much, who receives the treatment and who does not. For medicine, the two groups are equally important.

If Mrs. Smith finds out that Mrs. Jones' little boy was given the vaccine while her daughter was not, she meets a stone wall when and if she complains to the family physician, who points out that the whole matter is out of his hands. The advantage to medicine of using outside H Men, (*Turn to Page* 74)

PSYCHOLOGY

Stuttering Children Talk More, Not Less, Than Others

THE STUTTERING child is not driven by his speech defect to silence. On the contrary, stuttering children are considerably more talkative than are children with normal speech, tests conducted by Dr. H. Meltzer, of the Psychological Center, revealed. (*Journal of Genetic Psychology*, June.)

Fifty stuttering children from the speech centers of a large city school system were tested, as were also a comparable group of 50 children with normal speech. Each child was shown an ink blot and asked to tell what it looked like to him.

Here is the response of a talkative little stutterer—a ten-year-old girl from the fifth grade (with the stutters omitted for the sake of the printer):

"It looks like a butterfly. It has wings and its face is up in the front. It is very pretty. It has no color. It is spreading its wing. It looks like it is going to fly. It has something like a tail at the bottom. It has a straight line through the middle. Its face is very little."

And here is the terse reply of a 14-year-old sixth-grade boy who does not stutter concerning the same ink blot:

"A cloud."

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NUMISMATICS

"Holey" Money Suggested For New One-Mill Coins

WILL the United States have "holey" money—coins with the center cut away like the French 5, 10 and 25 centime pieces or Chinese coins?

As discussion of one mill and half-cent (five mills) coins to help payment of sales taxes throughout the nation wages in Washingon, officials of the U. S. Mint are wondering what kind of coin Congress will authorize, if and when it legalizes such minor currency.

The coins will be made of aluminum; of copper; and of combinations too diversified to be mentioned, according to unconfirmed rumors and off-the-record reports.

But at the offices of the Mint, from which the job of producing the coins will be directed, if they really are wanted, no one knows what size, weight or metal will be used.

All the Treasury officials know is that any coins—including any new ones to come—must be produced on the black side of the ledger.

A one-cent piece, for example, must cost less than a cent to produce.

With talk of a one-mill coin, the problem of producing a thousand of them for one dollar becomes a major mass production problem.

If Congress really authorizes the coinage of fractional cent pieces and fixes the size to be something like that of present coins, then it may be necessary to use the French technique of punching out the center and producing a doughnut coin to save metal.

That's one solution suggested so far to meet a problem which is yet to be faced.

More than that, the metals used in the coins will have to be cheap whether they are aluminum, copper, nickel, bronze, zinc or any of the diversified metals used by other nations of the world for their minor coins.

The assayers of the Mint are making quiet tests on various possible coin alloys but are saying nothing at all about what the metals used may be.

The Treasury, these days, is bending over backwards because of its peculiar position in that it does not want even to give the appearance of attempting to sway Congress in any way about legislation which has not yet been officially requested. And yet it must watch all fronts and be prepared to offer advice on the best possible type of coins, when, as, and if it is asked to do so.

Discussing the situation, Director of the Mint Nellie Tayloe Ross told Science Service:

"I would scarcely believe that Congress would wish to dictate the exact nature of the alloy in any new coins which may be suggested but would wish merely to authorize coinage. The expert assayers of the Mint are now working on tests to determine the best composition for minor coins."

Science News Letter, August 3, 1935

MEDICINE

Acid in Spinal Fluid Test For Brain and Nerve Diseases

THE AMOUNT of lactic acid in the fluid in the spinal cord gives valuable aid in diagnosing certain diseases of the brain and central nervous system, particularly meningitis, Dr. S. Bernard Wortis of New York City reported at the Second International Neurological Congress in London.

The measure of this acid may also be used to tell the physician something of the progress of the disease and the patient's chances for recovery, Dr. Wortis reported.

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IN SCIE

CHEMISTRY

Burn Oil Remaining In Exhausted Wells

OIL remaining in exhausted wells is being burned underground, and the resulting gases brought to the surface for use in industry, in a series of large-scale experiments conducted by Russian engineers in the great Baku oil fields. Hitherto such residual oil, estimated by some geologists to constitute as much as 20 per cent. of the original quantity, has been left as a total loss.

Analogous projects for the production of power underground have been proposed, for firing exhausted coal mines in the United States and other coal-producing countries.

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PUBLIC HEALTH

Mottled Teeth Increase In Vast Area of Texas

MOTTLED enamel of the teeth, a condition traced to water supplies, is on the increase in a vast area of Texas, affecting many thousands of inhabitants, the U. S. Public Health Service has learned by a survey.

Changing from a normal smooth, glossy surface and creamy color, teeth of the affected individuals show opaque, paper-white patches and streaks, and there may be brown stain and tiny pits in the tooth surface. Very small quantities of fluorine in water supplies can cause this dental disease, it has been demonstrated.

"The Panhandle-west Texas region constitutes the largest mottled-enamel area in the United States," says the report to the U. S. Public Health Service by Dr. H. Trendley Dean of the Service and R. M. Dixon and Chester Cohen, representing the Texas State Department of Health.

"The fact that the municipal water supplies of such large cities as Amarillo, Lubbock, and Plainview contain the causative factor of mottled enamel in sufficient concentration to produce this hypoplasia in a high percentage of their children, has developed an acute and urgent public health problem."

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EE FIELDS

ENGINEERING

New Link Forged in World-Wide Communication Chain

THE possibility of imminent war between Italy and Ethiopia has resulted in the newest link in the world-wide system of radiotelegraph communication to handle the expected increase in message traffic.

Cable and Wireless, Ltd., of London, announces that London and Addis Ababa, Ethiapian capital, are now in direct communication by radio. The previous circuit included a relay station in Cairo, Egypt.

Messages from the United States are transmitted from New York to London by RCA Communications, and then to Ethiopia by its British associate, Wireless and Cable, Ltd.

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ASTROMOMY

"Forbidden Light" Unseen On Earth Clue to Nebulae

"FORBIDDEN light," which in reality never reaches the earth, has been indirectly analyzed by the spectroscope to give man increased knowledge of his remotest neighbors of the universe, the far distant nebulae.

Dr. I. S. Bowen of the California Institute of Technology announced this achievement at the Massachusetts Institute of Technology spectroscopy conference.

Applying a recently developed astronomical theory, he has investigated the light which does reach the earth and has worked back to an analysis of the "forbidden" wavelengths of light. This light with its plentiful energy is situated in the extreme ultraviolet of the spectrum and it is believed to cause the light that reaches the earth.

Theoretically the forbidden light, present in the powerful energy of the extremely hot stars, excites the tiny atoms of helium and hydrogen in the star. As these shaken-up atoms return to normal, they emit the light that reaches the earth. This phenomenon is known as "the florescence of hydrogen and helium in the stars."

For some time scientists have been seeking to learn more about the astronomical islands whose distance in space is measured in terms of millions of light years with the penetrating eye of the spectroscope to aid them. Astronomers have been able to analyze some of the light coming from these nebulae and have learned much concerning their composition, probable origin and condition.

The fact that all the light leaving the nebulae does not reach the earth, some of it being filtered out by the layer of ozone circling our globe, has been a great obstacle to more complete knowledge. Attempts to produce this light artificially in the laboratory have also failed, and the light has been termed "forbidden" since science has never been able to analyze it.

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AERONAUTICS

Torn Fabric Caused Loss Of Soviet Balloon

RIPPED balloon fabric ended the recent (June 26) Soviet stratosphere flight just as it caused the failure of the Army Air Corps-National Geographic Society balloon Explorer II before it left the ground.

Whereas no lives were seriously endangered by the latest American adventure, the Russian flight in the balloon U. S. S. R. One Bis ended without major tragedy only because two of the three men who made the ascent jumped in parachutes and lightened the load at the crucial instant.

Details of the Soviet venture have just reached Science Service in Washington in mailed dispatches from Moscow. They offer a picture of what might well have happened to the Explorer II if its accident had occurred in the stratosphere instead of on the ground.

Prof. Alexander Verigo, chief physicist of the Department of Radioactivity and Cosmic Rays of the Geophysical Laboratory in Leningrad—who was scientific observer—and engineer Y. Prilutski, the co-pilot, were the two men who jumped. Chief Pilot K. I. Zille was then able to bring the balloon to a safe landing without damaging its highly valuable scientific apparatus and priceless cosmic ray records.

At 45,000 feet altitude on the ascent the balloon passed through a layer of turbulent air which tossed the 24,000 cubic meter bag to and fro. It is believed that this stormy session caused the rips. The buoyant gas quickly leaked away and only the parachute jumps stayed the rapid descent to a degree that made a safe landing possible.

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METEOROLOGY

No More Floods in Mississippi Valley

RESIDENTS of the central valleys drained by the Mississippi and its tributaries can breathe easier now that mid-July has passed without heavy rainfall. Ol' Man River keeps on flowin', but the flood season should now be over for 1935, says M. W. Hayes of the U. S. Weather Bureau. Past records of the Bureau fail to show that any extensive flood ever occurred between July 15 and winter in the Mississippi region, he says.

The ways of Nature can not always be predicted with exactness, however. From all indications, there should have been no floods in the Central Valley region this spring. The floods turned out to be the worst since 1927, due to unusual circumstances.

In most heavy flood years large amounts of rainfall during the preceding fall and winter saturate the ground, making water from the spring rains run into streams and rivers and cause them to overflow. This spring the ground was parched and dry from the 1934 drought, and streams were at extremely low levels. Hard and continued spring rains, coming suddenly, saturated and packed the surface soil, preventing absorption by the dry ground underneath. The water ran off into streams, bringing them from low levels to the flood stage quickly.

In the Central Valley region the use of river gauges enables the Weather Bureau to predict the possible rise in a river from two days to a month in advance.

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ASTRONOMY

Dr. Adams Elected Officer Of Astronomical Union

DR. WALTER Adams, director of Mt. Wilson Observatory, Pasadena, Calif., was elected a vice-president of the International Astronomical Union. Dr. Adams was the only American among the officers elected.

New president of the Union is Prof. E. Esclangon, director of the Paris Observatory. Other vice-presidents besides Dr. Adams include:

Prof. C. Bergstrand of Upsala University, Sweden, and Dr. H. Spencer Jones, astronomer royal of Greenwich Observatory, England.

The new secretary of the Union is Dr. J. H. Oort of Leiden University.

The next assembly of the international astronomical group will be held in 1938 at Stockholm.

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is thus apparent.

From the hundreds of cases, both vaccinated and control, Dr. Gilliam hopes to determine whether fewer new cases will be reported among those who receive the vaccine than among those who did not receive it. If the difference is sufficient, medicine will be fairly certain that the vaccine did some good by providing artificial immunity.

If the number of cases is about the same for the two groups, then the positive beneficial effect of the vaccine will be in doubt. Then medicine will be back where it is at present with regard to the use of convalescent blood serum in treating polio.

It has been believed that the blood of people who have recently had infantile paralysis contained properties which protected the individual against a second infection from the disease. The theory was that if this blood were injected in other people the chance of getting polio would be lessened.

The idea is good but not too well substantiated by actual test. The present accepted status of the use of convalescent blood is that it is harmless but not very helpful.

That is what medicine hopes it won't find for the Park-Brodie vaccine after the Greensboro test is complete.

Although not one of the H Men, another outsider is undertaking a supplementary experiment in connection with the Greensboro test of Dr. Gilliam. He is Dr. W. Lloyd Aycock, of Harvard's Infantile Paralysis Commission.

Dr. Aycock is particularly interested in tracing the influence of one's hereditary background on the incidence of the disease.

North Carolina, where there is less inter-marriage among racial types than in the more northern populous states and cities, offers a golden opportunity for this investigation.

In addition, Dr. Aycock wishes to trace, if possible, the growth in immunity in a community during the actual progress of an epidemic.

Each child in Dr. Gilliam's test therefore, either a control or a vaccinated child, has a blood sample drawn before and after the six weeks experiment.

Immunity Test

With this blood a neutralization test is performed. That sounds complicated but isn't so difficult to understtand. A blood sample from the subject is mixed in certain proportions with a known virus of infantile paralysis. The mixture is injected in Rhesus monkeys in the laboratory. If the monkey finally dies, it is indicated that the original blood sample did not have the immunity properties which were capable of neutralizing the virus.

If the monkey remains healthy, it means the immunity property of the blood sample neutralized the virus and made it harmless.

By making this test before and after giving the vaccine, and by doing it also on the controls, the scientists are able to obtain additional evidence of the possible immunity provided by the vaccine. And for the control group, which received no vaccine, they are able to trace the possible growth in natural immunity during an epidemic.

If the vaccinated group shows no more immunity increase than the control group, the value of injecting the vaccine will be questionable.

Out of it all, whether individual patients suffer or not, medicine is going to learn the truth about the value of the infantile paralysis vaccines so that in future epidemics better methods of control can be used. That's what the hard-boiled H Men have to find out.

"All Men Are Equal"

Infantile paralysis is one disease which is no respecter of a person's status in life. Its history discloses that it strikes rich and poor alike and disregards race, creed and color. Sir Walter Scott from the past and President Roosevelt from the present are but two names of famous victims of the disease which might be picked from many.

As examples, Sir Walter and the President illustrate also two different ages when the disease came. Scott was stricken at eighteen months, while still teething. Infantile paralysis, in fact, was once known as teething paralysis because it mainly attacks children while cutting their baby teeth.

President Roosevelt was a mature man in the prime of life, a much rarer sort of case.

That both men achieved their greatest success in life after the onslaught of the disease shows what careful care and treatment can do to remove the complete hopelessness sometimes erroneously associated with the affliction.

Epidemics have a way of creeping up on physicians and laymen alike, but the North Carolina case is the exception. Of all the people and children in Raleigh who might have been the first to be stricken with the disease, the polio scourge picked out the child of C. J. Parker, city editor of the Raleigh *News Observer*, whose publisher is Josephus Daniels, former Secretary of the Navy under President Wilson and now Ambassador to Mexico.

This combination worked for good and bad. North Carolina's epidemic was publicized from the time it really came into being in Raleigh. Some will say it was over-publicized.

Good or bad, the publicity did two things. It awakened doctors and parents to the danger, spurred the prompt reporting of cases and speeded isolation measures; but from the economic standpoint it has proved worrisome to the popular vacation regions of the North Carolina mountains and the North Carolina seashore.

Safety vs. Trade

Telegrams and 'phone calls from worried parents about to take children on summer vacations can be answered honestly by telling the truth: that in time of polio epidemics safety demands children should not be exposed any more than is absolutely necessary. Complete isolation, remember, is the only sure preventive measure. The truth, therefore, has decreased North Carolina's vacation trade.

Dr. Carl V. Reynolds, State Health Officer, and Dr. J. C. Knox, State Epidemiologist, have been the men caught in the cross-fire between medicine and commerce. The truth and medicine came first.

But the truth, while discouraging during the peak of the epidemic, was not all scare-headline material. Even in the worst epidemics of history—as in that in New York City in 1916—only one person out of 500 contracts the disease.

More than that, the true picture can not be obtained by simply counting the total number of cases during the entire epidemic. What really matters is the number of cases in the infectious stage. Using North Carolina as an example, there is the mass picture of over 300 cases since the first of the year; and the much more encouraging picture represented by the greatly smaller number of cases still in the crucial infectious stage, numbering about one-third as many. For a typical day, say July 10, the total cases stood at 338, while only 108 at that time were infectious.

Three Dangerous Weeks

Three weeks is the key period during which health officers consider an infantile paralysis case infectious. The first ten or twelve days of this period are a time of growth of the virus, its incubation period. The remaining time is allowed for to cover what an engineer would call the "factor of safety."

A study of the age distribution of the

infantile paralysis cases in North Carolina discloses that the name is in many ways a misnomer. The disease is not wholely a children's disease although the greatest incidence is among those under five years of age.

In North Carolina's current epidemic 62 persons over thirty-five years old, had contracted the disease (up to the middle of July). Children under five, however, accounted for over half the cases.

Cases broken down into their classification as urban or rural, male or female, and White, Negro or Indian, follow closely the population distribution as given by the state census. Thus, the oncoming of the disease seems not to be explained by the place of living, sanitary conditions or other factors which account for the spread of other infectious diseases.

Whether or not the potential victims have been fortunate enough to have built up some natural immunity in the past, seems to be the biggest factor.

Either you have such natural immunity or you don't. What medicine hopes will come from its vaccine experiments in North Carolina is some definite proof that at least artificial immunity can be provided. Parents of children in the path of the epidemic and everywhere else share that hope.

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AERONAUTICS

Zeppelin Models Whirled At 200 Miles per Hour in Tests

See Front Cover

A TWO-TON revolving arm which hurls twelve-foot zeppelin models through space at 200 miles an hour was exhibited to the experts attending the lighter-than-air craft forum at the Daniel Guggenheim Airship Institute.

The giant whirling arm—as long as the average city block is wide—is designed to make accurate tests on zeppelin models to check where the greatest strains occur in time of severe storms; times of disasters like that which caused the crash of the Akron off New Jersey.

The twelve-foot-long model zeppelins, whirled round and round by the device, have sixty small holes drilled in them from the extreme nose to the tail. Separate rubber tubes are connected to each hole and the sixty tubes run through the hollow whirling arm back to three score manometers, which indicate the air pressure at each given hole in the hull.

The long glass tubes of the manometers contain red fluids whose relative heights give an accurate picture to the research scientists of the pressure forces distributed along the model's hull. As a final automatic touch, a photographic film passes behind the tubes and makes a permanent record of the heights at one minute intervals for each one-sixtieth of the model's length.

Knowledge gained from the tests will be applied to the construction of future airships to make them more sturdy at the points where they experience the greatest strains.

The two-ton whirling arm which makes 200-mile an hour model speeds possible is mounted ten feet off the floor of the laboratory on a huge concrete and steel base weighing four tons.

The arm resembles nothing so much as the old-fashioned horse-powered feed mill, which applied the elementary principle of hitching a horse to a long pole made fast to the upright drive shaft of the mill and walking the horse round in a circle.

The lighter-than-air craft forum was the first of its kind ever held in America. Its object was to review the present status of the airship from the engineering and scientific viewpoint, according to Dr. Theo. Troller, director of the Guggenheim Airship Institute, where meetings were held.

Outstanding airship experts of America were in attendance at the technical sessions, whose chairman is Dr. G. W. Lewis, Director of Aeronautical Research, National Advisory Committee for Aeronautics.

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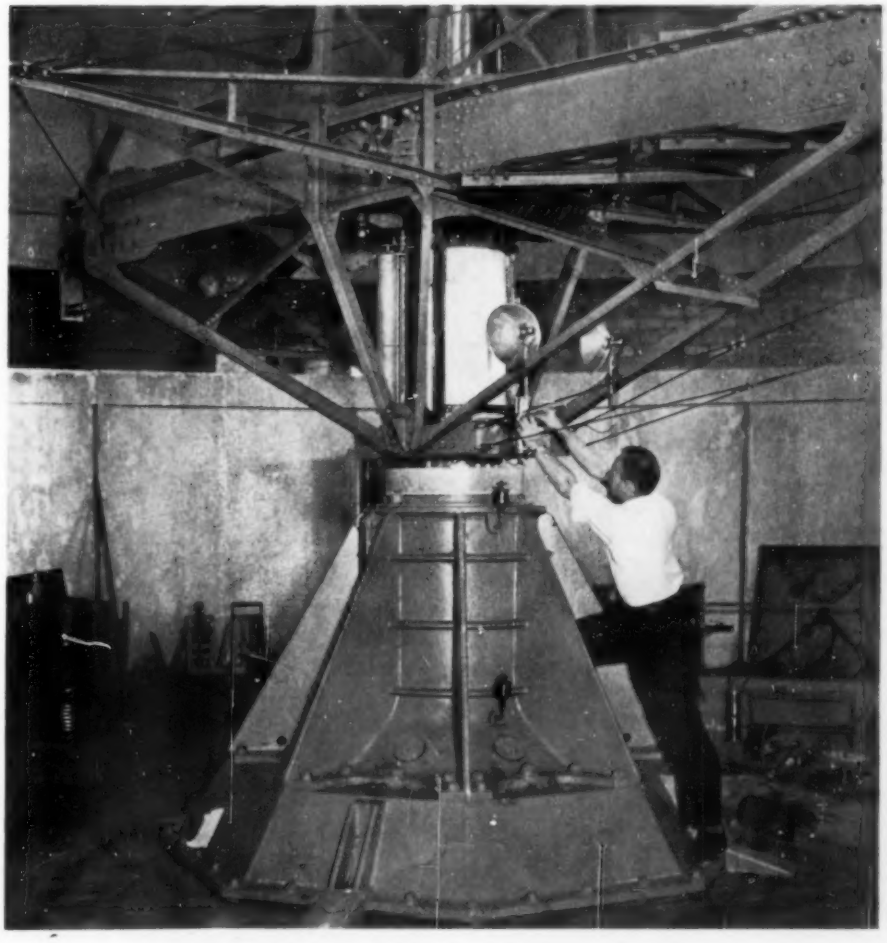

WHIRLING ARM FOR AIRSHIP TESTS

This spinning device whirls 12-foot zeppelin models about in synthetic storms to test their weathering ability. Dr. Theodore Troller, director of the Guggenheim Airship Institute, is here shown adjusting the automatic photography unit which records the readings of the instruments.

GEOLOGY

Sinking of Earth's Crust Near Boulder Dam Expected

MAN at last has a chance to determine whether the earth's crust—from 17 to 75 miles thick—will bend under a great weight. Theory says it will, but until the construction of Boulder Dam was undertaken, no way seemed possible to prove the answer.

Scientists of the U. S. Coast and Geodetic Survey are planning to make accurate surveys of the region around Boulder Dam to see if the weight of the dam and the huge lake it will store up are sufficient to compress the underlying rock of the great continental shields.

The estimated weight of the lake alone is placed at 41,500,000,000 tons. Never before has man placed such an enormous weight on one spot of the earth's crust.

Theory says the solid layers on the outside of the earth really float on a much heavier material which lies below in a plastic state. The condition is much like a woven raft of logs afloat on a lake. If a heavy weight is placed on such a raft, it submerges partially.

It is thought that the weight of mountains similarly submerges the bottom of the solid crust into the underlying plastic material.

Behind the plans of the Coast and Geodetic Survey is the thought that an additional increase in weight at one spot will further sink the floating crust until equilibrium is established.

Engineers expect that the elastic compression of the rock in the earth's crust will cause an area of twelve square miles to sink six-tenths of a foot in from two to three years.

The sinking of the solid crust into the plastic matter beneath may cause an additional two-foot drop over an area of 150 square miles. How long this lowering will need to occur, is not known.

Eventually, however, bench marks soon to be established will tell the story.

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ENGINEERING

Steam Engine Replaced Camel; Now Diesel Replaces Steam

LOCOMOTIVES with Diesel engines are replacing those propelled by steam on the desert railways of Turkmenia, U.S.S.R., just as steam engines once replaced the camel.

Because steam locomotives were forced to carry heavy tanks of water necessary for the journeys across the sun-baked sands, Soviet engineers tried out Diesel-locomotives as an experiment. Tests having proved them to be more powerful and speedy in addition to needing little water, at present 18 powerful Diesel-locomotives are in use between Krasnovodsk and Chardzhuy, a distance of about 709 miles. Formerly 30 steam locomotives were necessary to haul the heavy trainloads of oil, cotton, grain, fruit, and other cargo over the same distance.

In a recent test, Soviet engineers claim that a Diesel locomotive built at the Kolomna plant near Moscow covered a distance of over 3,700 miles without taking on water or refueling on the way, pulling a freight train. Because of their success in Turkmenia, where all locomotives will soon be those of the Diesel type, the Kolomna plant is being enlarged with the idea of replacing steam locomotives in other parts of the U.S.S.R.

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ASTRONOMY

Sunlight Studied to Find Cause of Storms on Sun

THE CAUSE of mysterious storms that rage in spots on the sun is being sought by sunlight analyses being made by Drs. G. G. Cillie and Donald H. Menzel of Harvard Observatory.

Some form of super-excitation of the hydrogen and helium in the sun are believed to cause the storms, Dr. Cillie told the Massachusetts Institute of Technology spectroscopy conference. But what causes this unusual excitation is still a mystery.

It may be exceptionally strong ultraviolet light which scientists have not found, due to its being screened out of the sunlight by the ozone gas surrounding the earth. But both Drs. Cillie and Menzel feel sure that whatever causes the storms comes directly from the surface of the sun and not from the solar atmosphere as other astronomers have suggested.

Tremendous heat might also cause this high excitation, but scientists have discounted this theory since it would require a sun having a temperature of more than ten thousand degrees Centigrade. This is nearly twice as hot as the accepted measurement of six thousand degrees which scientists believe to be fairly accurate.

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CONSERVATION

Pressure of Population Cited as Cause of Erosion

"EROSION" is the answer returned by Dr. W. C. Lowdermilk of the U. S. Department of Agriculture to the ancient question, that might appropriately have been asked by the Great Sphinx, half-buried in drifted desert dust: What caused the fall of ancient nations?

In a study presented to the Society of American Foresters, Dr. Lowdermilk cites his own explorations in northwestern China, and backs up his personal conclusions with the opinions of other scientists on the causes of the fate that overtook the civilizations of Asia Minor and North Africa, Peru and Yucatan. (*Journal of Forestry*, June)

Air photographs of ruins in these lands, he says, are strikingly similar. "All such ruins are in regions of scarce vegetation, bare hillsides, and rocky lowlands. History tells of vast armies surging back and forth across these regions. They must have been entirely dependent for food upon the surrounding country. Yet now these barren, dry lands scarcely sustain the scattered native populations.

"The great despoiler of civilizations and landscapes is soil erosion, by wind and water. It is a disease which has followed man throughout the centuries in his exploitation and destructive treatment of the good earth from which he received his sustenance—a disease, difficult to discern at first and responsive to treatment in the early stages, but absolutely fatal to civilizations in its final stages."

Pressure of population, in the old lands, is what led men to strip the uplands of their protecting forests and thus release the destructive power and wind to bear the soil down the hills and spread flood and ruin in the valleys. The Maya civilization apparently had to undertake its migrations because it was "choked to death by mud washed from its own hillside corn patches."

Our own erosion problem is a result of population pressure in a somewhat different phase. It was not a population expanding "in place," but a vast, horde-like rush over lands rich in virgin fertility. Knowing nothing and caring nothing about soil conservation, since the problem simply did not occur to their age as a problem at all, the pioneers stripped the forests, grazed the prairies down to the roots, and plowed everything for get-rich-quick boom crops. They passed to their graves in the assured conviction that they were "building the country."

They did build an empire, but at the same time they planted the seeds of its destruction. And it is up to the present generation to find a way to avoid harvesting the crop of desolation which their grandsires unwittingly and for the most part innocently left in the birthright they bequeathed us.

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ANIMAL NUTRITION

Cod Liver Oil Injures Heart And Muscle of Farm Animals

Investigators Warn Against Feeding Large Doses To Grass-Eating Animals Pending Further Research

A DIET containing cod liver oil has been found to produce muscle and heart injuries in various grass-eating animals, according to studies covering a period of seven years recently reported by Prof. C. M. McCay, Dr. L. A. Maynard and L. L. Madsen, of the Laboratory of Animal Nutrition, Cornell University.

The injuries have been much more severe with a synthetic diet of purified food, but toxic symptoms have also been obtained with natural foods.

Rabbits, guinea pigs, sheep and goats have been found susceptible to these injuries. Sheep and goats on pasture, receiving a daily dose of 7/10 gram of cod liver oil per 1,000 grams of body weight, died within ninety-three days, showing the toxic symptoms. Animals receiving half this amount succumbed within 226 days, but an intake of 1/10 gram did not produce any observable harm over this period.

The writers point out that the levels of cod liver oil which have been found injurious are not in excess of the amounts sometimes recommended for various farm animals and for children. They suggest that the feeding of the oil to farm herbivora in any but the lowest amounts is open to question, pending further study. The writers recognize that their results have no direct bearing on the use of cod liver oil in human nutrition, but they feel that the wisdom of the use of the large intakes which have been frequently recommended should receive careful reconsideration, particularly in view of the reports by certain European investigators of heart injuries in infants receiving this oil.

Cod liver oil is used in nutrition because of its content of vitamins A and D. The writers have found no evidence that the injuries obtained in the herbivora are due to the vitamins themselves. In fact, their results show that the harmful factor lies primarily in the part of the oil which does not contain the vitamins. This means that this harmful factor is at least largely gotten rid of in the manufacture of cod liver oil concentrates which are frequently used as sources of the vitamins in place of the oil itself.

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CONSERVATION

Drought, Wind and Flood All Cause Soil Erosion

THREE months ago dust storms rolled over the nation from the Mississippi River valley to the Atlantic Ocean. A month ago flood waters raged on the upper tributaries of the Mississippi. Recently Montana had a tornado and New York its cloudburst-caused flood. Property damage for these scattered tragedies ran into millions of dollars.

But the one common denominator of all the disasters, in terms of dollars, was unmentioned. It was soil destruction. And the economic loss from this cause may well have amounted to more dollars than the property damage. Certainly the damage to the soil incurred was the most permanent damage.

"Houses and other property destroyed by the raging waters can be replaced; crops swept by prairie winds can be replanted. But fertile soil blown high in the air or washed by the ton into streams and rivers is lost forever," points out H. H. Bennett, Chief, Soil Conservation Service in Washington.

Dust storms are the most spectacular means by which the average man receives a token of the hazards of soil erosion. Much more serious, because of its constancy and wide spread, is the gradual washing of topsoil—the farmer's stock in trade—into streams and rivers, Mr. Bennett adds.

It is not the dramatic cloudburst, and its floods, which worry the Conservation Service as much as it is the almost invisible erosion which constantly occurs.

In a radio address delivered for Science Service over a nationwide network of the Columbia Broadcasting System, Mr. Bennett told how topsoil washing over the years is a two-way menacing problem.

First the erosion takes away the farmer's "principal"—the soil on which his crops will grow. But more than that, when the soil is washed into streams and rivers it becomes an unwanted menace. The erosion washings make a river shallower, and hence broader, since it must carry about the same volume of water.

As a result the danger of floods becomes more prevalent and the farmers along the river valley are thus "caught" in a second way.

Even the city dwellers may soon notice the effects of the erosion. Giant reservoirs which represent millions of dollars investment of their money catch the washing and gradually fill up with silt. Their capacity is lowered and the investments endangered.

Controlling erosion, said Mr. Bennett, is a nation-wide long-range problem:

"If the Soil Conservation Service can initiate erosion-control measure on all seriously erosive lands within the next ten years, if it can secure reasonable control of erosion within the next twenty years, and if it can establish preventive measures on practically all the better lands of the country within the next generation, it will have gone a long way toward a solution of the problem."

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CHEMISTRY

California Wells May Give 1,000 Tons of Dry Ice a Day

Natural Pressure of 230 Pounds Per Square Inch Reduces Artificial Pressure Necessary to Solidify CO_2

NATURE has provided raw material for a gigantic refrigeration plant by the side of one of the greatest outdoor hothouses for winter fruits and vegetables in the world—the Imperial and Coachella valleys of southern California. Huge reserves of natural carbon dioxide gas, from which is made "dry ice," have been located under the torrid Salton Sea Basin of southern California, it was reported to the American Chemical Society. The gas is tapped from wells drilled starting at 200 feet below sea level.

One thousand tons of "dry ice" can be produced each day at one location on Mullet Island alone, according to Thomas B. Slate, pioneer construction engineer in that field. The natural pressure of 230 pounds to the square inch reduces the artificial pressure necessary to turn the pure carbon dioxide into its solid "dry ice" form, and consequently the cost is much less, estimated by Mr. Slate at $10 per ton.

Almost limitless possibilities in the field of household refrigeration, air conditioning, railway refrigeration and dairy technique are seen. Located as they are on the transcontinental line of the Southern Pacific, the gas fields open new possibilities for the cheap refrigeration of the vast tonnages of fruits and vegetables shipped eastward across the continent every year. Not only does "dry ice" provide an ideal cooling agent, according to Prof. G. Ross Robertson, of the University of California at Los Angeles, but the pure gas itself, introduced into a closed and sealed freight car, creates an insulating "blanket" which does not readily conduct the outdoor heat.

Scientists are at a loss to explain the extreme purity of the Salton gas, shown by tests to range from 99.1 to 99.6 per cent. pure carbon dioxide. There is no unpleasant intermixture of hydrogen sulfide, better known as "rotten egg" gas because of its similarity in odor to aging eggs. Like most natural carbon dioxide, it is probably made by the action of oxidized sulfur on natural mineral carbonates such as limestone. In this case purification is effected far below the surface by some unknown process.

Although discovered some three years ago, no reduction of gas pressure has been noted, indicating that almost limitless amounts of the gas are stored. Dr. Dwight Roberts, California geologist, estimates that about thirty-five billion cubic feet of the gas are already stored, capable of yielding nearly a million tons of "dry ice."

"Experience in Mexico has shown that carbon dioxide wells may run at full blast for years without diminution, all of which suggests renewed supplies by chemical action deep below the surface," said Professor Robertson.

Boulder Dam has removed forever the threat of inundation of the area by a flood of the Colorado River, it is thought.

Science News Letter, August 3, 1935

BOTANY

NATURE RAMBLINGS by Frank Thone

Unjustly Condemned

HOW OFTEN bright and brave things have to suffer for the crimes of others, who do their sinning sneakily!

Goldenrod, without question, is going to be cursed again this summer by millions of hay-fever sufferers, on the flimsiest kind of circumstantial evidence. They begin their agonies of sneezing and inflamed eyes just about when goldenrod comes into bloom. The two events are associated in time; therefore they are assumed to be causally connected.

Nothing could be farther from truth or justice. The pollen that actually causes most hay-fever cases during goldenrod time comes from the ragweeds, which also come into full flower in late summer. But their flowers are relatively inconspicuous green things, which most people would hardly recognize as flowers at all, since they lack the conspicuous petals and bright color that we commonly associate with flowers. So the honest bright goldenrod gets the blame.

As a matter of fact, goldenrod pollen hardly gets into the air at all. It is a heavy, sticky type, like most pollens produced by bright flowers that depend on insects to carry the fertilizing dust. It can be shaken into the air if you thrash an armful of goldenrod around enough, but it is hardly probable that it drifts very far. It is not impossible that there are a few persons who are susceptible to goldenrod pollen, but to get a sneeze out of a bunch of goldenrod you would just about have to burrow into it with your nose.

Ragweed pollen is quite something else. It is a dry, fluffy stuff, particularly well fitted for drifting down the wind, as the flowers that produce it are particularly adapted for discharging huge quantities of it into the air. Recent studies at the University of Minnesota have

shown that in the month of August there are likely to be about 1,000 ragweed pollen grains in every cubic yard of air.

There doesn't seem to be anything one can do about the ragweeds. They are among our most abundant roadside and wasteland vegetable hoboes. Except for cleaning up vacant lots in cities, cleaning them out by cutting is prohibitively expensive. The low ragweed species survives well in over-grazed pastures, for it is so tough and bitter that even a goat will not eat it.

The only thing that seems to help is the traditional "hair of the dog that bit you." Ragweed pollen is harvested by workers for some of the great therapeutic manufacturing companies and used in the preparation of immune serums that give lasting relief to at least some of the army of hay-fever sufferers.

Science News Letter, August 3, 1935

PLANT PHYSIOLOGY

Heavy Water Lowers Plant's Food-Making Efficiency

HEAVY water, in which the recently discovered double-weight hydrogen atoms replace the commoner single-weight ones, slows down the rate at which green plant cells can form food substances, Drs. James Curry and Sam F. Trelease of Columbia University have discovered. (*Science, July* 5.)

They used cultures of the simple one-celled water plant known as Chorella. Equal measured quantities of these cells were put into ordinary water and nearly pure heavy water, and their respective food-making efficiencies tested by measuring the amounts of oxygen given off as a by-product of the process. The results show that the cells in heavy water were only about two-fifths as active as those in the plant's normal medium of ordinary water.

The research was aided by a grant from the Rockefeller Foundation.

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PSYCHIATRY

Brief Treatment In Clinic Improves Mental Patients

Follow-Up of 500 Cases After Lapse of Three Years Shows That More Than Half Are Still Doing Well

THE VALUE to patients with mild cases of mental disease of a short course of treatments at a clinic is demonstrated by a follow-up of 500 cases treated at the Institute of Medical Psychology, London.

More than half of these patients were not only relieved at the end of the treatments, but still in an improved or much improved condition after an interval of three years, reports Dr. Mary C. Luff, assistant director of the Institute, and Marjorie Garrod, registrar, in the *British Medical Journal*.

The greatest success was observed in cases classified by the physicians as "anxiety states." This is the type of psychoneurotic illness so frequently masked as gastritis, irritable heart, nervous debility, and so on. It is considered as probably the most important form of psychoneurosis as far as industrial disability is concerned. At the end of the treatment, 80 per cent. of these patients showed considerable improvement, and 64 per cent. were still improved after the lapse of three years.

The Institute of Medical Psychology was founded in 1920 as the Tavistock Clinic. Since then the number of patients treated each year has steadily increased. Most are sent in by their own private physicians. Others are referred by hospitals, social organizations, and even the police courts. They are given interviews once, twice or three times a week, according to their needs, and these interviews are spaced more widely apart as they improve. If the patient is employed in the daytime, his appointments are arranged in the evening so as not to interfere with his work.

In case the home of the patient is not favorable for his improvement, or in case he lives too far away to come frequently to the clinic, he may be admitted to an in-patient department.

They pay according to their incomes up to a maximum of 7 shillings, 6 pence (about $1.85) a treatment.

A course of 20 interviews or fewer was found to be sufficient treatment for 50 per cent. of the 500 patients. Another 39 per cent. were seen from 20 to 60 times, and only 11 per cent. more than 60 times. The staff member in charge of the patient was required to call a colleague into consultation before continuing any course of treatment beyond 60 interviews.

The follow-up showed that the proportion of improved cases was just about the same regardless of the length of the treatment, demonstrating that brief, relatively inexpensive courses of treatment give satisfactory results.

"The question of length of treatment deserves serious consideration," the investigators comment, "for the number of applications to the Institute is very large, and it is important that no patient should be given lengthy treatment unless it is essential.

"The question is also serious from a wider point of view. Halliday has recently published a survey of 1,000 patients referred to him as regional medical officer under the Insurance Acts on account of prolonged incapacity. He estimates that roughly one-third of these patients are in reality incapacitated by psychoneurotic symptoms.

"If, as is probable, this proportion holds good throughout the country, the number of such patients requiring treatment is so great that it behooves all those concerned to use the shortest methods compatible with efficiency in dealing with their cases."

The policy of the Institute has been to avoid so far as possible the orthodox Freudian analyses which normally take two years of almost daily visits.

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First Glances at New Books

Anthropology

CULTURE AREAS OF NIGERIA—Wilfrid D. Hambly—*Field Museum of Natural History,* 137 p., 67 plates, $2. Traveling 5,000 miles through Nigeria, the Frederick H. Rawson-Field Museum Ethnological Expedition to West Africa studied and compared the Negro cultures and the foreign elements that have modified them. The data obtained, it is hoped, will prove of practical value to those concerned with administrative and educational work in this British African territory.

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Electrical Engineering

HOW TO UNDERSTAND ELECTRICITY—A. Frederick Collins—*Lippincott,* 326 p., $2.50. A good book on elementary electricity for boys of the high school age, which is really a textbook of the subject although the reader may be eased over that fact in going through the book. Mr. Collins' means of dodging the textbook style is to avoid algebra and start from scratch. It makes for a bigger, more unwieldy book, but if you don't know algebra it will be useful. The practical applications of the subject are stressed.

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Psychology

MAKING OUR MINDS BEHAVE—William S. Walsh—*Dutton,* 277 p., $2.50. A popularly written book by a physician, on "mental engineering."

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Chemistry

DICTIONNAIRE DE LA CHIMIE ET DE SES APPLICATIONS — Clément Duval, Raymonde Duval, and Roger Dolique—*Hermann et Cie., Paris,* 747 p., 90 fr. French chemical dictionary.

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Criminology

CRIMINOLOGY — Albert Morris—*Longmans, Green,* 590 p., $3.50. A textbook placing the emphasis on individuals, criminals and law-enforcement officers, rather than on institutions.

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Education-Ethnology

NEW JERSEY LENNI-LENAPE INDIANS (GRADE III)—Anna M. Casabona; AMERICAN INDIANS (GRADE II)—Hazel Brown Welsh—*Teachers College, Columbia University,* 28 p., 25c. A helpful account (for grade teachers) of how two teachers developed Indian units of study. The units are described so vividly and with so much information and so many germ ideas given in a small space that they would seem well adapted to achieve their purpose—creative teaching.

Science News Letter, August 3, 1935

Nutrition

CHILD NUTRITION ON A LOW-PRICED DIET—Mary S. Rose and Gertrude M. Borgeson—*Teachers College, Columbia Univ.,* 109 p., $1.50. A monograph written not very technically, so that others than nutritionists may understand and profit by its facts. Watching health progress of the 60 children in the test, the nutritionists made the welcome discovery that a very inexpensive diet for young children is efficient, if chosen wisely. A feature of the experiment was to compare the effects of "an egg a day" with a no-egg diet.

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Inventions

YOUR INVENTION—Elmore B. Lyford—*Radio and Technical Publishing Co.,* 210 p., $1.50. Designed to enlighten the inexperienced inventor as to how to be sure of his rights and be in a position to "cash in" on his creation, this book covers the whole field of patent matters. The tricks of the unscrupulous "promoter" are exposed, and the essentials of patent law set down in simple, non-legal language. Not intended by the author to be a textbook on patent law, it is rather a handbook of patent information for the layman.

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Geography

ECONOMIC GEOGRAPHY—Clarence F. Jones—*Holt,* 448 p., $1.80. A text intended for either a half or a full year's course, and suitable for high school or college use. The author has steered away from the encyclopedic atmosphere that geographies often attain when they try to "cover the world." Instead, he has organized the subject according to types of industries and occupations, and has kept up student interest by introducing concrete examples, rather than generalized facts, wherever possible.

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Anthropology-Design

GUATEMALA TEXTILES — Lilly de Jongh Osborne—*Tulane Univ.,* 110 p., illustrations, 5 color plates, $2.50. Describes the Indian technique of making and dyeing textiles, the garments worn, and unusual customs that assign certain colors and designs to certain villages. The author has lived most of her life in Guatemala and El Salvador and has gathered a unique collection of these beautiful textiles which seem fated to give way gradually to store products.

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Child Study

PROCEEDINGS, FIRST BIENNIAL MEETING, SOCIETY FOR RESEARCH IN CHILD DEVELOPMENT, WASHINGTON, D. C. NOVEMBER 3-4, 1934 — *National Research Council Committee on Child Development,* ix, 226 p., $1. A limited supply of the Proceedings is available to non-members. In addition to reports of business meetings, the volume contains symposia on dental caries and on prenatal and neonatal development, and reports of meetings of sections of Anthropology, Dentistry, Education, Parent Education, Nutrition, Psychiatry, Psychology, Public Health and Sociology.

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Population Study

INTERNAL MIGRATION IN THE UNITED STATES — C. Warren Thornthwaite and Helen I. Slentz—*Univ. of Pennsylvania Press,* x, 52 p., maps and graphs, $1. With a subject always interesting, but particularly at this time when the Government is attempting to evolve a population policy, this original study will repay careful reading.

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Psychology

GUIDING YOUR CHILD THROUGH THE FORMATIVE YEARS FROM BIRTH TO THE AGE OF FIVE—Winifred de Kok—*Emerson Books,* 191 p., $2. An English book, which perhaps accounts for the author's defense of restricting garments for young infants. It is written informally for the use of mothers and is filled with reference to Dr. de Kok's own two children.

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